

REMARKS

Claims 1, 2 and 4-47 are pending in this application. By this Amendment, claims 12, 17, 20, 23, 26, 27, 30, 33, 36, 40 and 43 are amended to correct minor typographical errors and not in reply to a substantive rejection. No new matter is added.

I. Claim Objections

Claims 17-20 are objected to due to an informality at line 6 of claim 17. As claim 17 is amended, Applicants request the objection of claims 17-20 be withdrawn.

II. Claim Rejections Under 35 U.S.C. §103

Claims 1, 2, 4, 13, 44 and 45 are rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,470,491 to Kodama et al. (Kodama) in view of U.S. Patent No. 5,604,073 to Krounbi et al. (Krounbi); claim 2 is rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of U.S. Patent No. 5,811,358 to Tseng et al. (Tseng); claims 5, 16, 26 and 36 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of U.S. Patent No. 5,820,770 to Cohen et al. (Cohen) and further in view of U.S. Patent No. 5,721,078 to Kamijima; claims 6-8 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of either Kamijima or U.S. Patent No. 4,444,869 to Chonan et al. (Chonan); claim 9 is rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of Cohen and either Chonan or Kamijima; claims 10 and 11 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of U.S. Patent No. 4,894,311 to Uenishi et al. (Uenishi); claim 12 is rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of Cohen, further in view of Kamijima, and further in view of Uenishi; claims 14, 24, 34 and 46 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of either Cohen or Kamijima; claims 15, 25 and 35 are

rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Krounbi and further in view of Cohen and Tseng; claims 17, 18, 27, 28, 37 and 38 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of either Chonan or Kamijima; claims 19, 29 and 39 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of either Chonan or Kamijima and further in view of Tseng; claims 20, 30 and 40 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of either Chonan or Kamijima; claims 21, 31 and 41 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of Uenishi; claims 22, 32 and 42 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of Uenishi and Tseng; claims 23, 33 and 43 are rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Cohen and further in view of Kamijima and Uenishi; and claim 47 is rejected under 35 U.S.C. §103(a) as unpatentable over Kodama in view of Uenishi. The rejections are respectfully traversed.

Applicants assert that none of the applied references, whether considered alone or in combination, disclose or suggest each and every feature recited in the rejected claims. For example, none of the applied references whether considered alone or in combination, disclose or suggest a method for fabricating a resist pattern, comprising the steps of forming a pre-resist pattern through exposure treatment and development treatment, the pre-resist pattern being made of a photo-resist layer as a top layer and a polymethylglutarimide layer as a bottom layer, and ash-treating the pre-resist pattern to form a narrowed resist pattern, as recited in claim 1, or the similar features of ash-treating the pre-resist pattern as recited in claims 17, 21, 27, 31 and 37.

The Office Action relies on the primary reference of Kodama in rejecting each of the pending claims. For example, the Office Action alleges that Kodama discloses a photoresist

pattern used as an etching mask during etching with a plasma of oxygen and freon by using a process gas composed of oxygen and at least one of a fluorine based gas and a nitrogen/hydrogen gas mixture to "shrink or narrow" the photoresist pattern while etching. The Office Action also alleges that Kodama discloses an ashing step used to "further shrink or narrow" and remove the photoresist pattern, as well as a subsequent ashing to remove the photoresist by either plasma alone or by plasma with additional ion beam ashing.

Applicants disagree with the interpretation of Kodama. Kodama teaches only to pattern the insulating layer and remove the photoresist mask by ashing and does not disclose narrowing the photoresist pattern. See, for example, col. 2, lines 27-39 of Kodama which recites "a photoresist being used as an etching mask, the pattern of the insulation layer being formed by etching with a plasma of oxygen and a freon containing at least one member selected from among CF_4 , SF_6 and CHF_3 , and the photoresist mask being subsequently removed by etching.

Additionally, as shown in Figs. 1c-1e of Kodama, the organic silicon resin 111 is whirl coated with a spinner and the applied coating is thermally cured by first heating it to 350°C in a vacuum over three hours and longer and then holding it at 350°C for one hour (Fig. 1c). The photoresist 112 is then patterned in the form of the desired insulation layer by a photomechanical process (Fig. 1d). Subsequently, the assembly is exposed to the oxygen freon plasma 13 so that the silicon resin is etched in the pattern of the first insulation layer (Fig. 1e). Then, the photoresist mask is subject to ashing with oxygen plasma 14 (Fig. 1f) (See col. 8, lines 20-33). Thus, the photoresist 112 is patterned by a photochemical technique to form the photoresist mask, and the silicon resin 111 is ashed with a combination plasma of oxygen and freon by using the photoresist mask. Thus, it is the silicon resin 111 that is patterned in a width-wise direction to match the configuration of the photoresist mask. After the patterning, the photoresist mask is removed by ashing using oxygen plasma.

In contrast, the rejected claims recite a pre-resist pattern made of the photoresist layer as a top layer and the polymethylglutarimide (PMGI) layer as the bottom layer. Thus, it is the PMGI layer and the photoresist layer that is narrowed in width by ashing. Thus, as recited in the claims, it is the pre-resist pattern that is narrowed by the ash treating to form a narrowed resist pattern. In contrast, Kodama clearly discloses that the photoresist 112 is patterned in the form of the desired insulation layer by a photomechanical process and then removed by ashing. Thus, Kodama only teaches to pattern the insulating layer and remove the photoresist mask by ashing and not to narrow the photoresist pattern. As such, Kodama does not disclose or suggest the features relied upon in the Office Action as forming the basis for rejection of all of the pending claims.

As Kodama only teaches patterning the silicon resin 111 in the pattern of the first insulation layer 112 by ashing through exposure to the oxygen/freon plasma 13 (Fig. 1e) and subsequently removing the insulation layer 112 by oxygen plasma 14 (Fig. 1f) Kodama does not disclose ash-treating the pre-resist pattern to form a narrowed resist pattern as recited in the claims. The Office Action admits that Kodama does not teach forming a polymethylglutarimide layer between the substrate and the resist pattern without subsequent partial removal of the PMGI by an alkaline water solution.

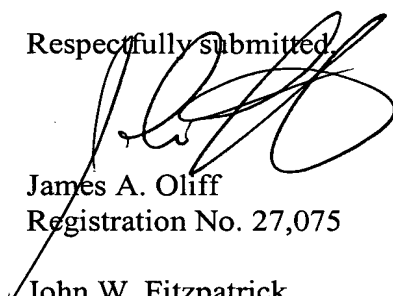
As Kodama does not disclose each and every feature relied upon in the Office Action to form the basis of the rejection of all pending claims, and none of the additional references discloses, nor are alleged to disclose the features that are missing in Kodama. Applicants respectfully request the rejection of claims 1, 2 and 4-47 under 35 U.S.C. §103(a) be withdrawn.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 2 and 4-47 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,


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